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XVII. — *Report on the Harrison and Lilloet Route, from the Junction of the Fraser and Harrison rivers to the Junction of the Fraser and Kayosch rivers, with Notes on the Country beyond, as far as Fountain.* By Lieutenant H. Spencer Palmer, R. E.

Communicated by the Admiralty.

Read, December 12, 1859.

Lieut. Palmer to Col. R. S. Moody, R.E., F.R.G.S., &c.

Sir, May, 1859.

As the existing route from Queenborough to Douglas can be performed throughout by steamers at certain seasons of the year, I deem it unnecessary to describe it in detail, dwelling only on those points where engineering works will be necessary to establish it as a permanent route for river steamers at all times.

The Harrison River runs into the Fraser from the northward, at about 35 miles by water above Fort Langley. At the mouth the river is broad and deep, and the current by no means swift, the water of the Harrison being backed up by that of the Fraser at this season of the year. About 3 miles, however, from the mouth it is extremely shallow and rapid, and although a channel does exist, which will admit of bateaux drawing 1 foot or 18 inches of water being towed through at the lowest stages of the water, it is a great deal too tortuous, narrow, and shallow, to admit of the passage of steamers of the class at present running on the Fraser, except at high stages of the water.

To render this route permanent it will be necessary to form a channel through these shallows of a considerable width (say 40 feet), which shall maintain a depth of at least 3 feet at all times.

At the time I made my reconnaissance the water was too high to admit of my forming any decisive opinion as to the works necessary for the above purpose; but from such information as I have been able to collect, in addition to what I observed myself, the portion that would have to be deepened is not more than a quarter of a mile in length.

I am of opinion that the simplest and easiest way to effect the formation of this channel would be by draining at the upper end of the shallows, an operation that would be greatly facilitated by the existence of the numerous small islands and bars with which this portion of the river is studded, and which, although covered at high-water, are perfectly dry in the fall of the year.

The damming might be effected in two ways: either, 1stly, so as to close the heads of the numerous slews and creeks through which the water at present runs, and thus drive it into one main channel; or, 2ndly, the water might be forced through a narrow channel by the construction of wing dams at such points as might be necessary.

The actual method to be employed can only be decided on by inspection at low-water; but, as the river at this part is from 500 to 600 yards wide, I am of opinion that the forcing of so large a body of water through a comparatively narrow aperture would have the effect of deepening the channel to the necessary extent without any excavation whatever. From this point to the head of Harrison Lake, a distance by water of 40 miles, no obstruction whatever exists to the navigation. The lake, which is 34 miles in length, is bounded on either side by cliffs so rocky and precipitous in most places, as almost to preclude the possibility of constructing a road along its margin; and the formation of a channel through the shallows of the Harrison River will, in conse-

quence, be necessary as a preliminary step to ensure constant communication with Douglas.

A short narrow creek, about half a mile in length, connects the north corner of Harrison Lake with a smaller one, called at present "Lake Douglas," about 1¼ mile in length and ¾ mile extreme breadth.

At the lower end of Douglas is a flat, shallow, gravelly bar; on which, although in summer time there is sufficient water to allow of the passage of steamers, there are not above five or six inches in winter.

There is also an extremely sharp bend in the creek, just below the bar, which is with great difficulty rounded by steamers, even at the highest stage of the water, and which at low-water, when the creek is not more than one-third of its present breadth, would, in my opinion, be impassable. I also think that the nature of the soil is such that, even if a passage were cut through the bar, there would be every probability of a fresh deposit taking place, owing to the sharp bend immediately below; and coupling this opinion with that above expressed, relative to the difficulty of turning the bend, I conclude that to ensure a constant steam-communication with Douglas, it would be necessary to cut a new and straight channel, connecting Lakes Harrison and Douglas.

The town of Douglas is situated at the head of the lake, on ground which descends to the water at a considerable slope and rises in rear of the town to a height of about 300 feet. This ground is a gully between two mountains, portions of chains which extend down either shore of the lake.

The town site is heavily timbered, with little or no land in its immediate vicinity which could be made use of for agricultural purposes.

Adding to these defects the fact of its being embosomed in hills, which render this mode of egress to the interior by roads extremely difficult, and the insufficient depth of Douglas Creek, I deem it a very badly chosen spot for a town, and a poor terminus to what is likely to form the main head of communication with the Upper Fraser.

The "Lilloet Trail" starts from the western end of Douglas, and, keeping to the left of the bed of the gully, ascends to a very considerable height (say 500 feet) on the side of the westernmost of the two mountains.

This portion of the trail is extremely bad.

The line of route that has been adopted is by no means the easiest that the nature of the country affords; and, although a considerable ascent is unavoidable, I think that by adopting a line of route which I shall presently describe, it need not rise to much more than half its present elevation. The bridges and corduroys are indifferent, and the road stony throughout, and in many places swampy for the want of small culverts and drains.

Few or no attempts have been made at regular grading, and the present trail rises in several places over spurs in the hill at grades impassable for any animals but mules, and barely so for them, descending as precipitously on the opposite side.

At about 2 miles from Douglas the trail reaches its greatest elevation.

It is then carried along on comparatively level ground for about half a mile, when turning sharp to the right it descends a steep hill to the bed of the ravine.

Crossing the ravine, at a considerable elevation, it is carried along the slope of the opposite mountain for a short distance, and then descends very precipitously by a zigzag path to a strong plateau about 140 feet above the level of the Lilloet River, running along this plateau for about half a mile by the side of the river till it reaches the Four-mile House.

In constructing a waggon-road on this portion of the route I would suggest as follows:—

It being almost impossible, from the nature of the ravine in the immediate

vicinity of Douglas, to carry the road along its bed, I would recommend that the existing line be adhered to for the first 900 yards, subject of course to such alterations regarding the precise spot of exit from the town as might be thought fit, and with any slight deviations that might improve the regularity of the grade.

On arriving at the first corduroy (900 yards from Douglas) I would keep to the right along the ravine, which at this point is on the same level as the trail, thereby avoiding an ascent of 200 or 300 feet.

A road might easily be constructed along this ravine for upwards of 2 miles, subject to no great variation in level, and, meeting the old trail at the crossing point, be continued on approximately the same line as far as the top of the steep descent to the plateau.

This hill is unavoidable, and can only be made practicable for loaded waggons by long grading through stony and rocky ground, at a very considerable expense.

On the "Stony Plateau" the trail winds most unnecessarily, and the construction of a straight waggon-road would be a matter of no difficulty whatever.

On leaving the Four-mile House the trail is generally pretty good, though a much better and straighter line of road might be adopted by keeping along the river-bank.

At about 1 mile from the house it leaves the river to the left, and mounts an extremely steep and stony hill at a grade at present almost impracticable for waggons. The ascent continues for about a mile, the descent to the river on the other side of the hill being equally as steep and precipitous as the ascent.

Rejoining the river about 3 miles from the house, and following it for about 300 yards, the trail again bends to the right and ascends a second hill longer than and equally as steep as the former one, descending to the plateau on which the Ten-mile House is situated, at an average angle of about 30° with the horizon.

On this portion of the route the same general defects exist as on the first part, viz.:—

A bad line of trail both in general direction and in detail. Precipitous ascents and descents; indifferent bridges and corduroys; a stony and irregular trail.

I would suggest the following changes in the route, my opinion being formed from an inspection of the places in question:—

The road, after leaving the Four-mile House, should be carried along the river-bank as far as the foot of the first hill, then, instead of bending away from the river, it should follow it round the base of the hill, meeting the present trail where it rejoins the Lilloet.

In this portion of the proposed new route there are two bad rocky places, each about 200 yards in extent, caused by spurs from the hill running down to the river, where a good deal of cutting and blasting would be necessary; but, as the remainder of the route is good for a road, I think this line would be far preferable to that over the mountain, which could not be made practicable for waggons except at an immense expense.

Where the old trail strikes the river again the two routes might coincide for 300 or 400 yards, and then, instead of mounting the second hill, I would adopt the same plan as before and follow the river round.

The road here, after going along an easy level plateau, for about 1 mile, would strike a small tract where a number of successive spurs tolerably level on the top, but with ravines between them, run down to the river in a southerly direction. The difficulty might, however, be overcome by careful grading round the heads of the ravines.

This formation continues for about one-third of a mile, after which the road would emerge upon a broad and beautifully level plateau, with little or no brushwood, and very light timber, much of which has been burnt.

This flat, which I have named in my plan the "Burnt Plateau," is about 1 mile in extent, and a good road along it might, I think, be made in two days by a party of 50 or 60 men. On arriving at the end of the Burnt Plateau I came to the "Glens" of the Lilloet River, and found that it would be absolutely impossible to continue the road along the bank, as the cliffs here run down to the water at a considerable angle with the horizon, and the huge boulders and fragments of rock which lie about, and the danger that would be incurred from future slides in the cliff, preclude the possibility of so doing.

If, however, the road be inclined to the right corner of the Burnt Plateau, it can be carried up at a tolerable grade to another plateau, between the river and the existing line of trail, but on a much lower elevation than the latter.

By following this route the additional advantage of an easy descent to the Ten-mile House plateau would be gained—a point of great importance, as the existing descent is barely practicable.

For the first half-mile, after leaving the Ten-mile House, the trail is very irregular. Several small ravines extend across the line of route to the river, and to diminish the steepness of the ascents and descents the trail is carried round the heads of the ravines. It also winds most unnecessarily on the level ground between them. Should a waggon-road be made here I would recommend that it be cut straight through; there is plenty of timber at hand, and bridges of from 40 to 60 feet span might be built across the ravines, which are only four in number.

After the first half-mile a cutting in the side of the hill (which is, I think, unnecessary, there being a fine flat below) leads to a Cedar Bottom magnificently timbered. I cannot speak positively as to the advisability of carrying the road along the flat mentioned above, as although it was dry when I was there, the water of the Lilloet may have risen since sufficiently high to swamp it.

The Cedar Bottom is a little swampy in two or three places; this, however, is caused not by the Lilloet River, but by small streams running down from the mountains, which frequently overflow and leave their natural beds, owing to obstructions caused by fallen logs, &c. This evil might be remedied by clearing proper channels for the rivulets, but I would suggest that a waggon-road should keep to the right on a higher line of level than the existing trail.

In the Cedar Bottom, which is about three-quarters of a mile long, and of an average breadth of 500 yards, the soil is very rich, but there is so much timbert hat I question its availability for agricultural purposes. At 1½ mile from the Ten-mile House the trail ascends a short steep hill by a zigzag path, and is carried along the side of a small mountain for about half a mile on undulating ground, rising with one more steep ascent to the top of a level, well-timbered and strong plateau on a spur from the mountain.

The hills, I fear, cannot be avoided, as the banks run down steep to the very edge of the river. At 3 miles from the Ten-mile House it runs down the hill, on the opposite side of the spur, and crosses a broad ravine, extending from the river to the mountains, and consequently unavoidable.

Crossing the ravine it rises with a long ascent of 1 mile, varying in steepness to a plateau on the summit of another spur. It is continued for half a mile along this plateau, and then descends a hill dreadfully stony, and so steep that it has been necessary, in portions, to zigzag the path to make it practicable for mules.*

* On arriving at the foot of this hill, a level stony plateau, one mile long, leads to the Sixteen-mile House, situated about 300 yards back from the river.

A waggon-road, if constructed, should be carried down the side of the first spur at a long and gentle grade, and, having crossed the ravine, should, instead of mounting the hill on the opposite side, be carried round the foot of the hill, by the river, on a much lower plateau than that on which the present route runs.

Circumstances prevented my actually walking over the ground in question, but from what I saw myself, and the information I collected, I think there would be no difficulty in adopting this line for the road.

Immediately on leaving the Sixteen-mile House the River "Acchuchlah" is crossed by a good substantial log-bridge of 45 feet span. A short rise then leads to the top of a fine plateau, about 30 feet above the level of the Lilloet River.

The trail is carried along the plateau at distances from the river, varying from 150 to 400 yards, and there would be no difficulty in constructing a good waggon-road on a much straighter line than the existing trail.

The plateau is 2½ miles long, and of an average breadth of 500 yards.

Timber abounds, chiefly hemlock-pine, and the soil, though stony in some places, is generally good for cultivation.

At the end of the plateau the trail descends a short hill to nearly the level of the river, and runs close to the water's edge for a short distance. I here passed a beautiful little patch of land about 3 acres in extent, abounding with roses and wild fruit, and which, if cleared, might easily be turned to some use. On the opposite side of the Lilloet is a large Indian wigwam and fishing-station, with a little clear land and some potato-patches around it. The trail now, for nearly a quarter of a mile, is cut in the side of a stony hill which runs into the water; but as this hill is subject to frequent slides, which would render it a matter of considerable expense to keep a road thus cut in repair, I would suggest that a sea-wall of stones be built 5 or 6 feet out in the river (which is here very shallow), and a road made on the top.

There are plenty of large stones at hand for this purpose, and I think it would be easier, cheaper, and generally more advantageous to construct a road in this manner than to make a regular cutting in the side of the hill.

After passing this hill I came to a long point which juts out to the left into the river, and at the extremity of which, 200 yards from the trail, are the Great Falls of the Lilloet.

The trail crosses this point on a good general line, and rejoins the river about half a mile further up; it then follows the bank at distances varying from 5 to 100 yards from the river, and about 15 feet above it, on a fine level plateau three-quarters of a mile long and 500 yards wide, with good rich soil, scanty timber, and little or no brushwood.

At the end of this plateau there is a very steep rise (zigzagged) to a ledge on a high clay-slate hill. The trail is carried along the side of this hill for about 200 yards, and then descends precipitously to the foot, whence a quarter of a mile tolerably level, but capable of great improvement, leads to the Hot-spring House.

This hill might be entirely avoided and a good road constructed round its foot, with the aid of a little blasting.

On leaving the "Hot-spring House" the trail runs for one mile along a fine broad flat, about 10 feet above the level of the Lilloet, following the bank for half a mile, and then leaving the river, which takes a bend to the left.

This flat is rather rocky and the soil light and sandy.

Hemlock and cedar abound, and there is very little underwood.

At the end of this mile the trail branches to the right and ascends a gorge between the mountain on the right and a high rocky bluff (named in my plan "Moody's Look-out") on the left. After reaching its highest elevation (about 250 feet), it runs on a comparatively level line along the top of the hill for about a quarter of a mile, and then descends along a steep hill to the

river bank. This hill should be avoided, if a waggon-road be made, by deviating to the left at the foot and following round the base. The ground is level and good throughout the greater part of the distance; the difficulties to be overcome being about 100 yards of rocky ground, succeeded by a piece 20 yards long, where the bluff rock runs nearly perpendicularly into the river. The first of these difficulties might be mastered by blasting; the second, by the construction of a sea-wall of the description proposed at the Great Falls. Immediately after getting round the point the road would strike a fine level flat, continued to the point where the present one trails the Lilloet.

For the next mile the construction of a road is simple enough, and it might be made much straighter than the existing trail; a little careful grading would be necessary to descend into a rise from the valley of the River "Schotscheen," which runs too far back to be rounded, and is too broad to be bridged. This river is about 50 feet wide, and is crossed by a good bridge of 60 feet span. Another mile and a half of very good level trail along a plateau by the river-bank, varying in breadth from 150 to 300 yards, leads to a spot marked in my plan as "Camp," close to the foot of a long range of steep hills. The land thus far is all more or less good for cultivation, timber being rather scanty, and little or no brushwood. The soil is rather light and strong, but is, I think, available for agriculture.

From the Camp it is exactly 6 miles by the trail to the house at the southern end of "Tenass Lake," known as the "Twentyeight-mile House," although in reality 34 miles by the trail from Port Douglas.

The mountains throughout the whole 6 miles run down to the water's edge, and the construction of a waggon-road along their sides would be a matter of great difficulty, labour, and expense. There is no plateau whatever along which the road could be carried, and no possibility of avoiding to any extent the steep ascents and descents to which the present trail is subject.

I think it, therefore, not only highly advisable, but positively necessary to cross the Lilloet River in the neighbourhood of the Camp. I examined the river for the purpose of finding the best crossing-place, and think that the most suitable spot is about 300 yards beyond the Camp.

Mr. Nicol, J. P., was kind enough, on a subsequent occasion, to walk down on the opposite side the whole way from the Lake to the Camp, and informs me that there is an excellent Indian trail along the river-bank, easily convertible into a good level waggon-road. The only obstructions are the rivers "Bmockwa," and another with two mouths, called in my plan "Delta B," both of which would have to be crossed by bridges of 50 or 60 feet span. There is, in addition to the above, one rocky place to be passed, but this would be no great impediment to the construction of the road. I have since had an opportunity (while I was descending the Lilloet in a canoe on my return) of examining portions of this part of the proposed new route; and am of opinion that it would be advisable in more ways than one, as, in addition to the advantage of having a level waggon-road, there is a great deal of good agricultural land in the neighbourhood, which would thus be opened up for cultivation.

The trail is at present continued beyond the Twentyeight-mile House, as far as the southern end of Lake Lilloet, a distance of 8 miles.

I propose, however, by a method I shall presently describe, that the south end of Tenass Lake be made the terminus of the first portage, eight miles of land-transport over anything but a good road being thereby avoided.

There is an excellent site for a town at the terminus of the new route I have proposed, and as a small one would be very likely to spring up at the junction of the land and water communications; this would be a farther inducement to

its adoption, there being no sort of site for a town at the terminus of the present trail.

Lakes Lilloet and Tenass are connected by a small river about 1½ mile in length, rapid, and towards the mouth very shallow. The difference of level between the lakes I ascertained to be 10 feet 6¾ inches on the 23rd May, 1859.

By constructing a dam of the necessary height across the Lilloet River, where it leaves Tenass Lake, the water in the two lakes might be brought to the same level, and a permanent water-communication thus established. This damming would have the effect of swamping portions of the flat land in the neighbourhood of the Tenass River, but that at the terminus of the proposed route is too high to suffer in like manner.

The dam might easily be constructed of logs, snags, and stones, plenty of which are at hand.

Possibly a permanent water-communication between the two lakes might be effected by deepening the Tenass River at and near its mouth. As, however, I was not on the ground at the lowest stage of the water I cannot speak as to the extent of the portion that would have to be deepened; but, from such information as I could collect, it would only be necessary to form a channel at and near its mouth.

On this part there are, I am told, but six inches of water in winter time, the remainder of the river quite deep enough to admit at all times of the passage of steamers of the small class likely to be established on the lakes.

Thus far I have described such deviations from the existing line of trail as would be required, supposing it absolutely necessary to construct a waggon-road on the left bank of the Lilloet from Douglas as far as the Camp.

I am, however, of opinion that the site of Douglas is extremely badly chosen.

In addition to the defects I have already pointed out I am informed by the Indians that Lake Douglas freezes in the winter, and remains so for some time, while the Harrison never freezes at all.

In the north-west corner of the latter lake there is a high dry site for a town, accessible at all times to boats and steamers, and open to the valley of the Lilloet River. As a protection from the sea, which is sometimes rather rough for boats, a breakwater of snags might easily be constructed at the point shown in the plan, to form a small harbour, behind which they might lie in safety. By making this the terminus of the route a constant steam-communication with Queenborough could be established (the channel once open to the Rapids of the Harrison River), and there would be this additional advantage, viz., that the flat land in the valley of the Lilloet would become opened up for cultivation.

From the cursory view I was enabled to take of the right bank of the river during my rapid descent in a canoe, I am of opinion that from the Harrison Lake to the point opposite the plateau, below the Sixteen-mile House, a road could be far more easily made along that bank than on the present route.

Not having actually walked over every portion of the ground, I cannot speak very decidedly on this point, but adding to the opinion I was enabled to form the fact, that the old Indian trail runs along the right bank the whole way from the Harrison Lake to the Tenass Lake, and the well-known circumstances that the Indian trails throughout North America invariably follow the best line of travel through a wild country, I conclude that at least a great portion of the road should be carried along that bank.

I have accordingly come to the following opinions on this point, viz.:—

"That the starting point of the route should be changed from Douglas to

the north-west corner of the Harrison Lake. That the waggon-road be carried along the right bank of the Lilloet River, as far, if possible, as the point opposite the lower end of the plateau, below the Sixteen-mile House.*

"That the River be bridged here, and the road carried along the left bank as far as 'The Camp,' following the general direction of the present trail, subject of course to the deviation already proposed.

"That the Lilloet be recrossed at the point marked on the plan, and the road then constructed on the right bank of the river, and terminated at the southern end of the 'Tenass Lake.'"

I may here mention that Sapper Breakenridge, who has since made a reconnaissance of the right bank from the Harrison Lake, as far as the point opposite the Four-mile House, reported to me, after going over both routes, that the one on the right bank, although rather swampy in some places, was far preferable to the existing one, and I think a still better might be found by keeping further back from the river.

The distance by water from the south end of the Tenass Lake to the north-west end of Lake Lilloet is about 21 miles, the shores of both lakes being equally as precipitous as those of the Harrison.

The town of "Pemberton," which, when I was there, consisted of five or six houses, stands on a wretched rocky site in the northernmost corner of Lake Lilloet. At high stages of the water the town is accessible to boats, but in the winter a long flat bar of sand prevents their coming within 500 yards of it. From this place the second portage commences, known now as the "Birken-head Portage;" nor is there any better starting point in the vicinity.

The valley of the "Upper Lilloet," which river runs into the lake at its western extremity, takes a westerly direction from the head of the lake. The river, about 5 miles from its mouth, divides into two, a large delta being left between the mouths, which, in summer time, is again divided in two by a creek. On this delta, and particularly towards its western point, a few farming-men have cultivated land, and there is also a large Indian village, surrounded by potato-patches, &c. In the centre of each island is a small lake, the ground, for a considerable distance from their edges, is swampy; but the banks are high and dry all the way round, contain good soil, and are covered with magnificent grass. The trail, on leaving Port Pemberton, is carried over ground very similar to that at the back of Douglas, but in this case the ravine has been adhered to, and the hills are far less precipitous than those near Douglas. I was unavoidably compelled, both on my way up and on my return, to travel very rapidly over this portage, and consequently unable to make detailed field-notes, or survey the route as accurately as I should have wished. The trail which, for the whole 24 miles, runs through a natural pass in the Cascade Range, is, on the whole, far better than that on the Douglas Portage, and, with the exception of blasting round two or three rocky hills, no great deviation from the present route would be necessary, *if Port Pemberton be made the point of departure.*

As, however, it might be necessary, in the event of this route being made the main channel of communication with the upper country, to establish a town of some size at the junction of the land or water communications, the site of Port Pemberton should, in this case, be abandoned.

There is a good site for a town, near the mouth of the "Mosquito River," which empties itself into the Upper Lilloet, opposite the Indian village, on the westernmost of the Lilloet Islands. If, therefore, the bar at the mouth of the southern or main branch of the river were deepened sufficiently to admit at

* If impossible to carry it as far as the point proposed, there are several good crossing-places along the river (one half a mile below the Four-mile House), but the Port Douglas Hill should by all means be avoided.

all times of the passage of steamers, I would suggest that the town be established at the mouth of the Mosquito River, and the road run along the valley, striking the old trail at its junction with that river. The large valley of the Upper Lilloet would thus be opened up and inducement given to farmers to clear and cultivate the land in the vicinity of this town, which might otherwise be neglected in consequence of its remoteness from any main route of communication.

About 17 miles from Pemberton the trail runs along the shore of a small lake, one mile long and half a mile broad.

This lake, which is situated on the summit of the Pass, is called "Summit Lake," and from either end there is a descent to the Fraser, that from the north by Anderson River, through Lakes Anderson and Seaton, and the River Imkumtch, and that from the south end by the Mosquito River, through the Lilloet and Harrison Lakes.

After passing the Summit Lake I crossed a tract of valley land 2 or 3 miles in extent, containing little timber, and good rich loamy soil, irrigable, if necessary, from Anderson River.

In the vicinity of Anderson, and for some little distance down the eastern shore of the lake, there is plenty of good grazing-land for sheep and cattle on the sides of the mountains; and I am informed that, owing to the absence of briars, &c., this part of the country is very well adapted for raising good wool.

The town of Anderson is situated, as shown in the plan, on the south-western end of Lake Anderson.

The site, as regards its suitability both for a town and a point of departure for steamers, is extremely good.

The bank is high and dry (about 15 feet above high-water mark), timber plenty and fine, but not too much of it, the soil good, and the land for one mile in rear flat, and easily irrigable. A good jetty has been built by the men who have settled there and own the boats that convey passengers across the lake, and, as the water is deep close in-shore, the port is accessible at all times to steamers.

From Anderson to the spot marked in my plan as "Wapping," which consists of one log-house for travellers to sleep in, is 14 miles by water.

The short portage connecting lakes Anderson and Seaton (1½ mile in length) commences here, and terminates at the spot marked "Flushing."

A Mr. Dozier, an American, who has established a waggon for conveying provisions across this portage, constructed a waggon-road last year, connecting the two lakes, entirely at his own expense.

The road is a very fair one, and as he has likewise constructed a neat and substantial bridge across the Seaton River of 60 feet span, I would suggest that, in the event of this becoming a permanent route, the by no means trivial service he has done to the colony be recognised.

It will be seen, on looking at the plan, that it is necessary to cross the river, as there is no starting-place for boats or room for houses, on the right bank, at the Lake Seaton end.

The land on this portage is stony, the timber is scanty, but the brushwood thick, and there is a fine patch of rich land to the north-west of Flushing. Both that place and Wapping are admirably adapted for the points of departure of steamers and as sites for small towns.

On the 30th of May I found the difference of level between the two lakes to be 59½ feet, a difference which would combine with the softness of the soil to render the construction of a canal of communication a matter of considerable difficulty. Several locks would, moreover, be necessary, and I question whether it would not be better to run the goods across the Isthmus on a tramway, which might easily be made from one jetty to the other.

At the eastern end of Lake Seaton, 14 miles by water from Flushing, is

situated the small town of "Seaton." The houses are built on the beach, which is not more than 30 or 40 yards broad in the widest places; and immediately in their rear a steep bank, about 100 feet high, leads to a large diamond-shaped plateau or bench, on which there is good grazing-land for cattle (bunch-grass) and very little timber. The site of Seaton possesses the same advantages, as a point of arrival and departure for steamers, as the other places on these lakes, but there is no room to establish a town except on the top of the bench, which would, I think, be too far above the water.

The trail winds round the point of the plateau at a steep rise, and, on attaining a height of about 50 feet, is carried along the side of the hill at an undulating level for about half a mile.

Here it emerges on a level and very stony plateau about one-third of a mile broad, bounded on the north by the Imkumtch, and on the south by the Kayosch River. These rivers join in one, about three-quarters of a mile further on, and the trail is carried along the plateau to within 100 yards of this point.

It then crosses the Inkmutch on a rough log-bridge, built last May by the packers, between Seaton and Kayosch. A large rock in the bed of the river forms a natural pier for the support of the centre of the bridge.

For the next three-quarters of a mile the trail runs along the side of a stony mountain at a considerable elevation, on a small ledge cut for the purpose. This portion of the route is very dangerous, and, owing to the frequency of large slides in the mountain side, impassable for a waggon-road.

Passing round the point of this mountain the trail emerges on the level grassy bench-land, peculiar to this district of the Fraser, and, running along this land for about 1½ mile at a very slight variation in level, reaches the small town of Kayosch, situated on the western bank of that river.

The benches in the vicinity of this portion of the Fraser, which are covered with bunch-grass, and in some places scantily timbered, would form excellent grazing-lands for cattle, but the soil is, I think, too dry to be cultivated to any extent. There are two or three small rivulets running through the bench on which the town of Kayosch is situated, which afford a supply sufficient for the wants of the present inhabitants, and for irrigating a small patch of about 10 acres on a lower bench in front of the town, now under cultivation, and I dare say more might be obtained by digging wells; but water to any great extent is not to be had on the upper benches, either on the Kayosch or on the Fort Behrens side of the Fraser.

The majority of the benches, although beautifully clear and level, are, I think, at too great an elevation above the Fraser River to be well adapted as sites for towns; that, for instance, on which Kayosch stands being about 150 to 200 feet above the river.

They vary in length from ½ a mile to 1½ mile, and in breadth from 200 to 1000 yards; the slopes connecting one bench with that above it being generally at an angle of about 45°.

I was unable to procure any means of crossing to the southern bank of the Kayosch, but I was able to see sufficient from the opposite side to convince me that on that bank, at its junction with the Fraser, is the best site for a town in the neighbourhood.

June 1*st*.—At this part a considerable flat, 300 or 400 yards wide, and about 20 feet above the level of the Fraser, extends some distance down the shore of the Fraser and up the Kayosch.

Behind this flat, and about 100 feet above it, is another extensive plateau to which a town might be extended, while any amount of water-power might be obtained in that portion of the town or the lower flat, by fluming from the Kayosch.

I suggest, therefore, that instead of crossing the Imkumtch at the forks of that river and the Kayosch, the latter river be bridged at or near the same point, whence an almost natural waggon-road extends to the proposed town site on the right bank, a distance of 125 miles.

The trail from Kayosch to the bank above French Bar requires no alteration whatever, extending along the flat benches at occasional slight changes in level for about 2¼ miles. It then runs down a frightfully steep bank to the "Bar," and as the remainder of the route both from this point to the mouth of Bridge River, and thence on to Morman Bar, is so bad as to render the construction of a waggon-road barely possible, I will proceed at once to report on the best route to Fountain that, in my opinion, the nature of the country will permit.

The Kayosch should, I think, be bridged from the south as near its mouth as practicable, the waggon-road carried round near the Fraser at the lowest possible elevation, as far as French Bar.

Crossing the Fraser at a point on the bar which will be found practicable where the river is only about 75 yards wide; * it should ascend the steep bank on the opposite side at a gentle grade, whence, with the exception of one place subject to slides, the road to Fountain is generally good.

Fountain is situated on the left bank of the Fraser, on a large bench upwards of a mile in length, about 500 yards wide, and 700 or 800 feet above the level of the Fraser, to which the bank makes a direct steep descent.

1½ miles beyond the fountain a trail branches off to the southward and runs at the back of the range of mountains which skirts the left bank of the Fraser as far as the Forks of the Thompson River. This trail is, I believe, the best and shortest route from the Forks to the upper country; the country between Kayosch and the Thompson affords every facility for the construction of a good waggon-road on the right bank, though the existing one on the left bank is, I understand, very bad for a large portion of the distance.

Water to a considerable amount is procurable at Fountain from a lake 2½ miles back in the mountain; but, although a town on the flat might be of some importance in connection with the branch roads to the Forks, Pavillon, and Kayosch, the site is at too great an elevation above the Fraser to admit of the establishment of a town in connection with any traffic that may at a future period take place on that river.

The land around and in the valley leading to the Forks is of the same nature as that around Kayosch, viz. excellent for grazing, but too dry in summer, unless well irrigated, to admit of agriculture to any important extent.

In the Bonaparte Valley, which extends from Pavillon to Fort Thompson, there are, I understand, from 40 to 50 square miles of rich land fit for cultivation. In this valley, too, there is a great deal of black marble, and limestones abound at Pavillon and its neighbourhood. With regard to Fountain I should add that a town there might, at a future period, be of importance in connection with a road from Canada through the Bonaparte Valley to Kayosch.

With reference to other interesting features on the route I would beg to call your attention to the following:—

At the south end of Harrison Lake, about three-quarters of a mile to the south-east of the point where the river and lake join, a hot spring, called "St. Alice's Well," is situated.

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* There is a rock about one-third of the way across, covered at high-water, but dry in the fall. On this rock a pier might easily be made.

The water, whose temperature on the 20th May, was 130° Fah., bubbles out of a small mass of conglomerate rock 6 inches above the then level of the lake.

It is highly sulphurous, but, owing to my having been unable to procure a perfectly clean bottle and cork, the specimen I sent down to Victoria proves, I regret, to be unfit for further analysis.

Another hot spring, somewhat similar to St. Alice's, and of about the same temperature, though not so highly sulphurous, is situated about 60 yards north-east of the Hot-spring House, $23\frac{9}{10}$ miles by the trail from Douglas. By a subsequent cursory examination, this water was found to contain chloride of sodium and sulphate of soda; but, owing to the impossibility of my procuring a perfect specimen, an accurate analysis could not be made.

Every sensible miner to whom I spoke on the subject, clearly admitted the existence of gold all along the banks of the Upper Fraser in considerable quantities; in quantities, too, that—were it not for the exorbitantly high prices of provisions and the want of good fresh meat and vegetables—would attract and retain thousands of miners who were then leaving the country. The great cry is for a waggon-road and cheap and good provisions, and these, once obtained, there will be no farther doubt as to the stay of the miners in the country.

Dry diggings have yet to be found, and, there is no doubt, will be found as soon as men have heart and strength to prospect the country in every direction; but as long as bacon and beans are the sole articles of diet, few, if any, will be found with the heart or strength to do more than support themselves by mining for a few hours each day, much less to travel over such a wild country and such bad trails, as they must do, in order to explore the districts in the vicinity of the Upper Fraser.

From the cursory view I was enabled to take of the general geological character of the country, Trappean rocks appear to prevail, consisting principally of greenstone, dense clay-slate (here and there presenting a laminated structure), and compact hornblende. The exposed surfaces of the rocks are very generally covered with the white deposit due to the decomposition of felspar, and are occasionally stained red with iron, forming an agreeable contrast in the landscape. Quartz veins permeate the clay-slate in many places, of an average thickness of from 1 to 12 inches; the formation, in fact, would suggest the high probability of metalliferous deposits.

The mountains rise bold, rugged, and abrupt, with occasional benches on their sides, on which are found quantities or worn rounded boulders, principally of coarse-grained granite, occasionally porphyritic. The granite contains golden-coloured and black mica in large quantities. The crystals of felspar in the porphyritic granite are very numerous, but small. The soil appears in many places to have been formed by the decomposition of granite—it being light and sandy, and containing much mica.

Below the soil is very generally found a white compact mass, very hard, and approaching to a conglomerate, containing pebbles of every description in a matrix of decomposed clay-slate. Lime seems wanting even in the conglomerate, and I saw no traces of limestone or sandstone all along the route, though I understand there is plenty of the former at Pavillon.

TABLE

TABLE showing the Astronomical Positions of important points on the route, as computed by LIEUT. H. SPENCER PALMER, R.E.

Station at	Latitude North.			Longitude in Time East of Queenborough.		Absolute Longitude West.		
	°	′	″	′	″	°	′	″
Queenborough	49	12	58		..	122	53	15
Mouth of Harrison River	0	14	25	3	25·596	0	1	51
South end of Harrison Lake	0	19	0	4	00·688	121	53	4
Douglas	0	45	35	2	46·808	122	11	33
Ten-Mile House	0	52	41	2	12.972	0	20	3
South end of Tenass Lake	50	3	0	1	10·445	0	35	38
,, Lilloet Lake	0	7	52	1	9·546	0	35	52
Pemberton	0	17	32	0	40·240	0	43	11
Anderson	0	32	13	1	11·872	0	35	17
Flushing	0	42	25	2	2·356	0	26	39
Seaton	0	40	18	3	10·146	0	5	43
Kayosch	0	41	51	3	22·753	0	2	33
Mouth of Bridge River	0	45	33	3	17·753	0	3	48
Fountain	0	44	44	3	27·508	0	1	22

TABLE OF DISTANCES.

From	To	Distances by Land (trail) in Miles.	Distance by Water in Miles.
Queenborough Camp	Fort Langley	..	17·000
Ditto	Mouth of Harrison River ..	..	47·700
Ditto	South end of Harrison Lake ..	..	57·700
Ditto	Douglas	..	92·700
Douglas	Four-Mile House	4·047	..
Ditto	Ten-Mile House	11·852	..
Ditto	Sixteen-Mile House	18·911	..
Ditto	Hot-Spring House	23·881	..
Ditto	The Camp	27·999	..
Ditto	South end of Tenass Lake ..	34·000	..
South end of Tenass Lake ..	Ditto Lilloet Lake ..	..	6·650
Ditto	Pemberton	..	21·130
Pemberton	Halfway House (2nd portage)	15·000	..
Ditto	Anderson	29·000	..
Anderson	Wapping	..	14·000
Wapping	Flushing	1·45	..
Flushing	Seaton	..	14·000
Seaton	Kayoosch	3·700	..
Kayosch	Mouth of Bridge River ..	4·200	..
Ditto	Point opposite Fountain ..	6·500	..
Total from Queenborough	To Fountain	74·65	141·83

Entire distance, Queenborough to Fountain, 216·48 miles.